

APPARATUS AND METHODS FOR INTEGRALLY PACKAGING  
OPTOELECTRONIC DEVICES, IC CHIPS AND  
OPTICAL TRANSMISSION LINES

Abstract of the Disclosure

5           Apparatus and methods for packaging optical  
communication devices include optical bench structures, such  
as silicon-optical benches (SiOB). An optical  
communications apparatus includes an optical bench  
comprising a substrate having an electrical turning via  
10       formed therein. An optoelectronic (OE) chip and integrated  
circuit (IC) chip are mounted on the optical bench and  
electrically connected using the electrical turning via.  
The electrical turning via extends in directions both  
perpendicular and transverse to a surface of the substrate  
15       such that the OE chip and IC chip can be mounted on  
perpendicular surfaces of the optical bench in close  
proximity and electrically connected using the electrical  
turning via. More specifically, the OE chip and IC chip are  
mounted on the optical bench such that a light-emitting or  
20       light-detecting surface of the OE chip is substantially  
perpendicular to a surface of the IC chip having contacts,  
and such that optical transmission lines that are mounted  
parallel to the substrate surface can be directly coupled to  
the OE chip.